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Case Report

Immediate esthetic rehabilitation of fracture vital and nonvital teeth: A novel approach

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ABSTRACT

Traumas that affect the hard tissues, cause functional and esthetic disturbances which are of great relevance especially when a patient is a public figure immediate treatment in such cases is mandatory for both esthetic and psychological reasons. In the pre-adhesive era, fractured teeth were restored either with pin retained restorations or metallic post. However, with development of adhesive dentistry more conservative approach can be adapted allowing the dentists to use the patient's own fragment to restore the fractured tooth. This procedure termed as reattachment can lead to immediate esthetic restoration. This article present the two successful conservative management of reattachment procedure.

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1. Introduction

Trauma of the oral and maxillofacial region occurs frequently and comprises 5% of all injuries for which people seek treatment.¹ Accidental trauma to the dentition of an individual is one of the most distressing incidents that can happen to an individual. There is perhaps no single dental disturbance that has greater psychological impact on both the parent and the child than the loss or fracture of a child's anterior teeth, especially if the injury affects the permanent dentition and involves loss of extensive tooth structure.² With the advent of adhesive dentistry, the process of fragment reattachment has become simplified and more reliable, it has also allowed dentists to use the patient's own fragment to restore the fractured tooth.^{3–10} This article present the two successful conservative management of reattachment procedure in vital and non vital teeth.

2. Case 1

A 21 year old female patient reported to the department of Conservative Dentistry and Endodontics presenting with a history of fall resulting in broken teeth in the upper front region with lower lip laceration. The fractured tooth fragment brought by the patient with an elapsed time of 5 minutes was then in Hank's balanced salt solution (Slen Cell™) to prevent dehydration. Informed consent was obtained from the patient after explain the treatment planning. On clinical and radiographic examination the diagnosis of Ellis class II fractures on maxillary left central incisor was made and reattachment procedure was planned. The tooth fragment was secured by gutta percha stick (Dentsply, De Trey, Germany) in order to facilitate handling. The tooth was isolated and irrigate with normal saline to remove the all the dust particles. Mock placement of the fragment into position was done to evaluate the result and treatment outcome. The fragment was prepared for reattachment by giving an external chamfer bevel and two vertical grooves on both the fragment and the tooth.

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Acid etching was done using 37% phosphoric acid (3M ESPE Scotchbond™) on both the substrates for 10 seconds after that it was thoroughly rinsed off for 10 second and gently air dried for 10 seconds . After that 2% CHX (Ultradent Products, Inc, South Jordan, UT, USA) was applied for 20 seconds, rinsed with water spray for 20 seconds and gently dried for 10 seconds. Then three coats of the adhesive (Adper Single Bond2, 3M ESPE) were then applied to both the substrates and light cured for 15 seconds. A flowable composite (Filtek Z-350,3M ESPE) was used for filling the inter fragmentary space and the fit was reverified. The excess was removed and the composite layer was photo polymerized from the facial, incisal and palatal surface using light curing device (Demetron Demi LED, Kerr Corpoation,CA,USA) for 60 second. Finishing and polishing was done using Soflex discs (3 M ESPA Sof Lex™). Although the reattachment line could be noted in a close-up view, the patient was very satisfied with the results. During follow up visit, patient was asymptomatic.



Fig. 1: A,B: Preoperative clinical photograph; C: Fracture fragment; D: Reattachment and vertical groove preparation; E: Post operative photograph

3. Case 2

A 23 year old male patient reported to the department of Conservative dentistry and Endodontics after traumatic injury resulting in a complicated crown fractured in his upper left front tooth region of jaw. The fractured tooth fragment was recovered by the patient at the site of the injury and maintained in a storage media (milk). On the basis of clinical and radiographic examination, diagnosis of Ellis class III fracture was made in 21. Root canal treatment followed by reattachment was planned.

After attaining profound local anesthesia (2% lidocaine) and rubber dam isolation, access cavity were prepared using Endo access (Dentsply Maillefer,USA) and Endo Z bur (Dentsply Maillefer,USA). Working length was determined using an electronic apex locator (Root ZXII™,Morrito,Tokyo,Japan). The canal was instrumented

using step back technique with final apical gauging upto size 50K file (M access K file, Dentsply Maillefer,USA). Cleaning was performed by copious irrigation with 3% sodium hypochlorite (Septodont, India), followed by normal saline and 17% EDTA solution (Smear Clear, Sybronendo, Kerr, Italy) using EndoActivator System (Dentsply Tulsa Dental Specialties, Tulsa, UK). After that canal were dried with absorbent paper points (Dentsply,New Delhi, India) and was obturated using AH plus sealer (Dentsply, Maillefer, USA), matching gutta percha cone and down pack with calamus plugguer (Dentsply,Maillefer,Switzerland). The coronal tooth fragment was secured by gutta percha stick.

The coronal third, pulp chamber, tooth and fractured segment were etched with a 37% phosphoric acid gel for 30 second, it was rinsed thoroughly for 10 second and dried. 2% CHX (Ultradent Products, Inc, South Jordan, UT, USA) was applied for 20 seconds, rinsed with water spray for 20 seconds and gently dried for 10 seconds. After that all substrate were coated with an ethanol-based adhesive system (Adper Single Bond Plus, 3M ESPE) and photopolymerized. A 3mm width ribbon fiber (Ribbon bondable Reinforcement Ribbon, Seattle, Washington USA) was dipped into the bonding agent and place into the canal to gain retention from the canal. After that flowable composite was inserted into the canal and the fractured segment was then placed on the tooth precisely, paying special attention to the fit between the segments. When the original position was reestablished, excess resin was removed and photo polymerization was performed with a light curing device (Demetron Demi LED, Kerr Corpoation,CA,USA) for 60 seconds from incisal, palatal and facial surfaces making sure that no displacement of the fragment occurred during the procedures. After polymerization the margins were polished using flexible aluminium oxide discs of different grain sizes (Sof-Lex, 3M ESPE). The occlusion was carefully checked and post operative instructions were given. During follow up appointment the tooth was asymptomatic and functional.

4. Discussion

Choosing the correct treatment in case of traumatic injury depends on the age of the patient, the extension of the fracture, the presence/absence of endodontic involvement, the condition of the tooth fragment, the occlusion and esthetics; time and patient expectations and the follow-up evaluation and care.¹¹ There are several treatment modalities for such condition, one of which is reattachment of fractured fragment itself.¹² The advantage of the re attachment technique are that it is a conservative technique (as no additional preparation is required to restore the teeth), esthetic (as original tooth fragment is attached), cost effective, requires minimum chair side time and gives psychological assurance (as original tooth fragment is

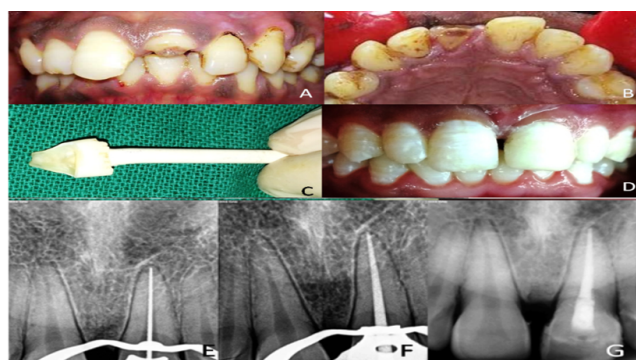


Fig. 2: A: Preoperative clinical photograph facial view; B: Preoperative clinical photograph palatal view; C: Clinical photograph of fracture fragment; D: Postoperative clinical photograph; E: Working length KOPA; F: Master core KOPA; G: Obturation and postoperative KOPA

attached and no extra preparation is required) and wear rate is similar to that of adjacent tooth.¹³ If treatment option fails, all other options are open for further treatment. There are five types of reattachment technique, simple reattachment technique, enamel beveling, V shaped internal enamel groove, internal dentin groove and over contour.¹⁴ There are also some perceived disadvantages like color stability, less esthetic result especially if the tooth fragment is dehydrated, unknown prognosis, follow up etc.¹⁵

5. Conclusion

With the materials available today, in conjunction with an appropriate technique, esthetic results can be achieved with predictable outcomes. Thus, the reattachment of a tooth fragment is a viable technique that restores function and esthetic with a very conservative approach, and it should be considered when treating patients with coronal fractures of the anterior teeth, especially younger patients.

6. Conflict of Interest

The authors declare that there is no conflict of interest.

7. Source of Funding

None.

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